



WP9: Airborne System Design Requirements



Overview

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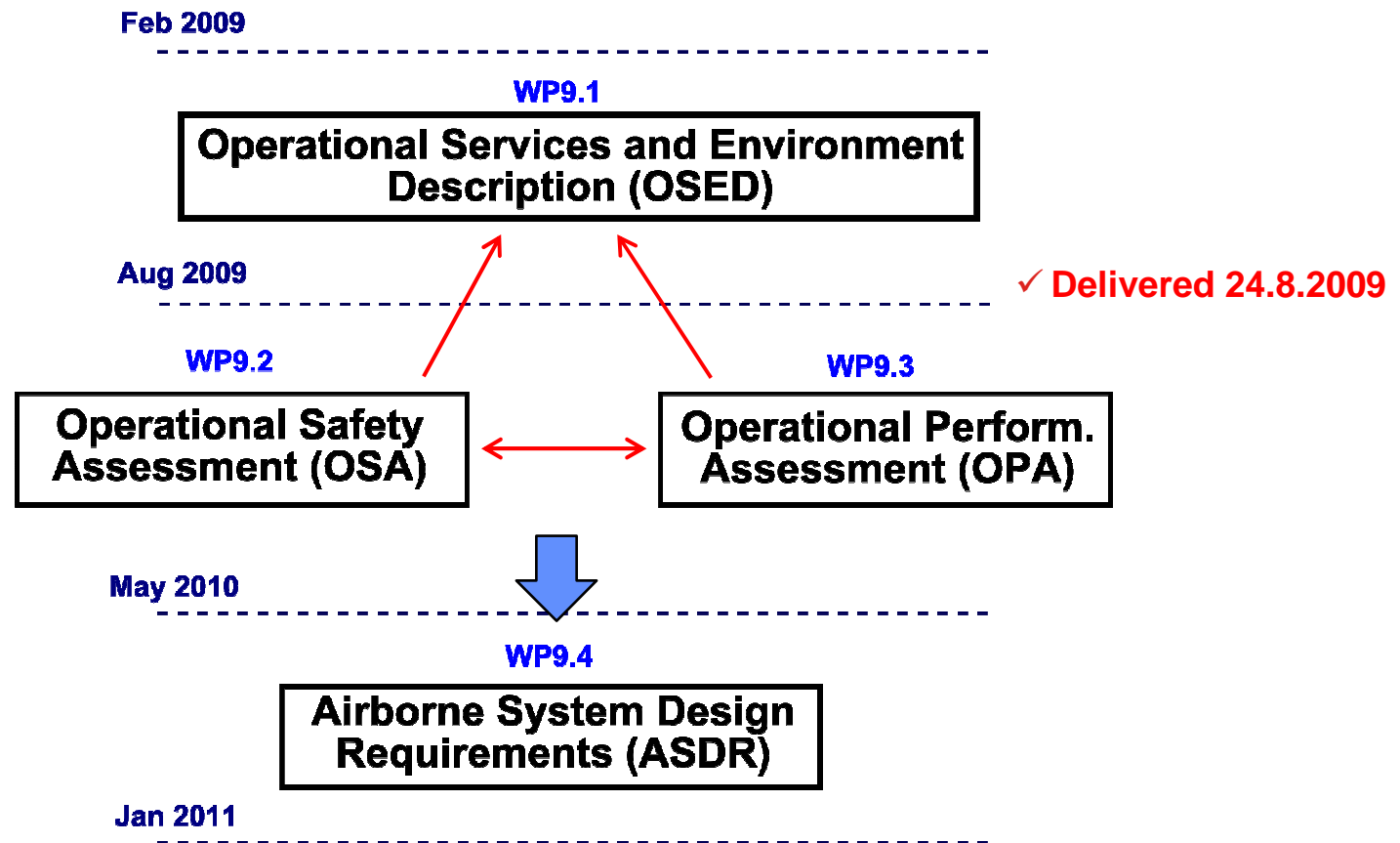
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WP 9 Outline

Goal:

Perform a preliminary Safety Performance Requirements (SPR) development cycle according ED78A/DO-264

Schedule & WBS



Presentation Outline

✓ WP9.1 – OSED

- Considered Inputs
- Applied Approach
- OSED Overview

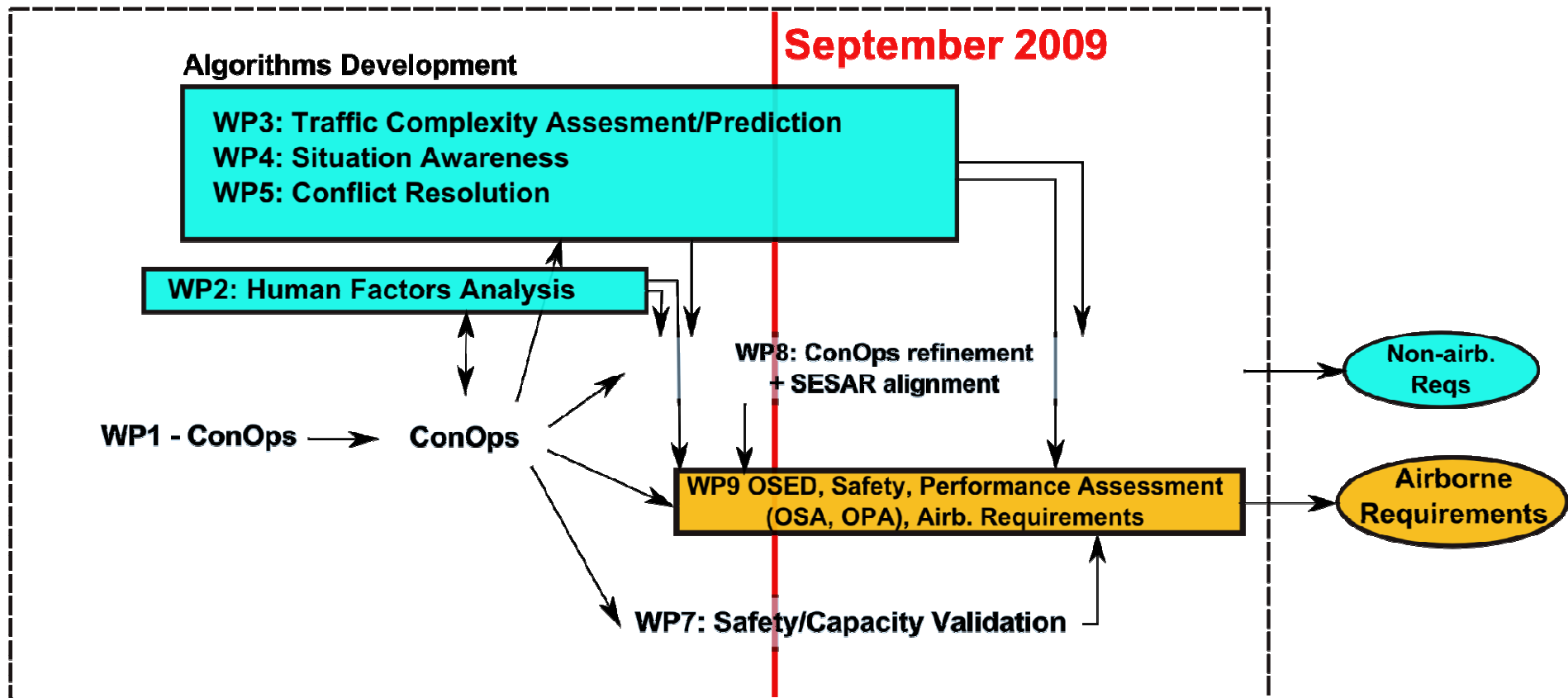
➤ Next/Ongoing steps

- Operational Safety Assessment
- Operational Performance Assessment



WP9 Inputs: Internal within the iFly Project

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WP9 Inputs: External

➤ Surveillance

- MASPS for Aircraft Surveillance Applications DO-289
- ADS-B MASPS DO-242A
- 1090 MOPS DO-260A

➤ ASAS

- Action Plan 23 deliverables D3, D4
- ASAS MOPS DO-317 (Surveillance)

➤ ASAS Package I

- **ATSA – ITP:** SPR DO-312, NASA HIL Study
- **ATSA – VSA:** SPR DO-313
- **ATSA – AIRB/SURF, ASPA-IM:** monitoring evolution of SC-186/WG-51 RFG work on OSED, OSA, OPA documents

➤ ACAS

- TCAS II high-level documentation
- TCAS II MOPS DO-185



WP9.1 Approach

Two different views on A3 operations:

Airborne Perspective

- Processing of detected events
- Performance-focused parameterization
- High-level functional system requirements

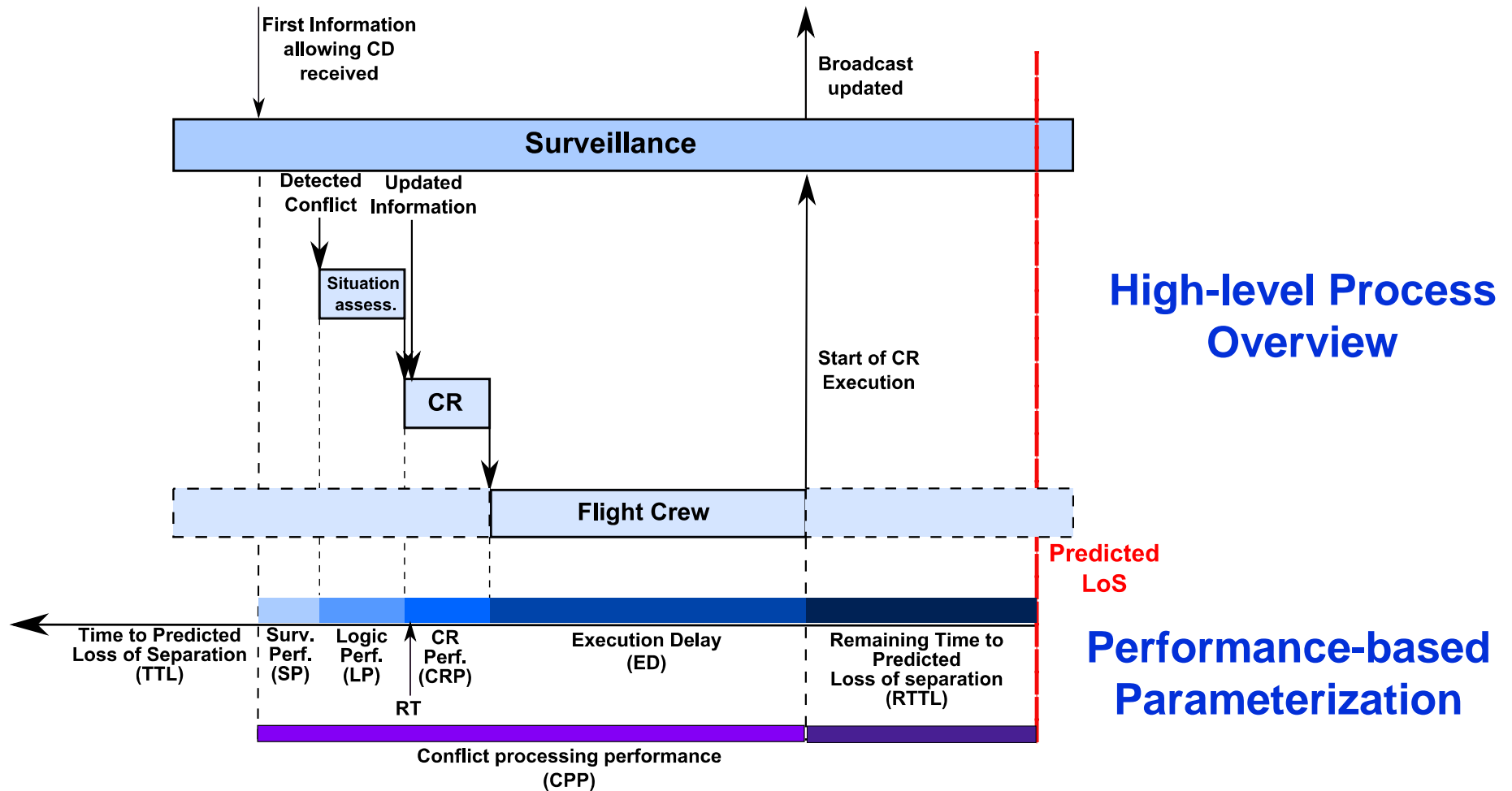
Operational Perspective

- Focus on information (trajectory) sharing
- Decomposition of A3 operations into stages

Airborne View – Conflict Processing

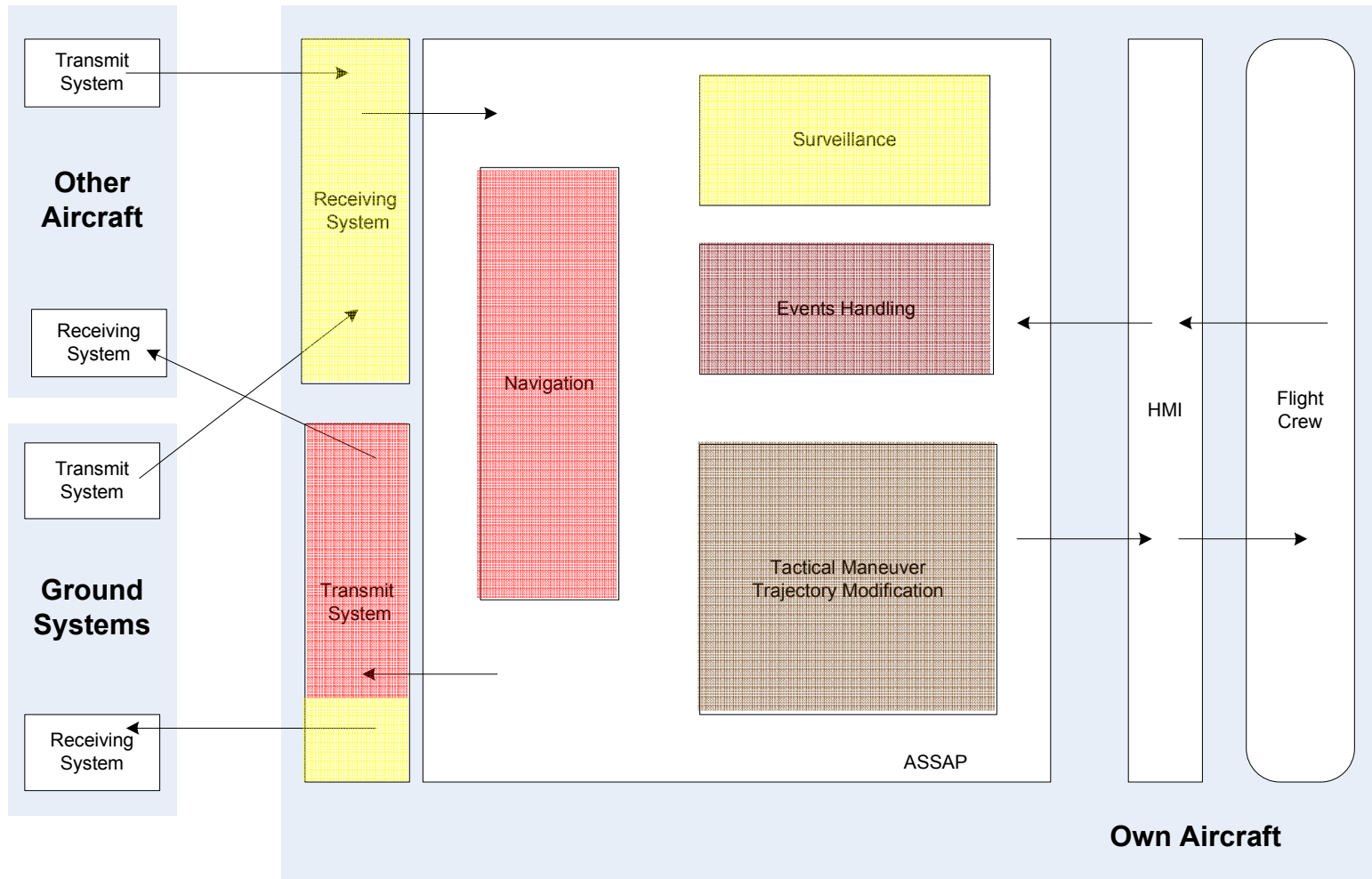
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ASAS Separation Management: Reaction to detected threats



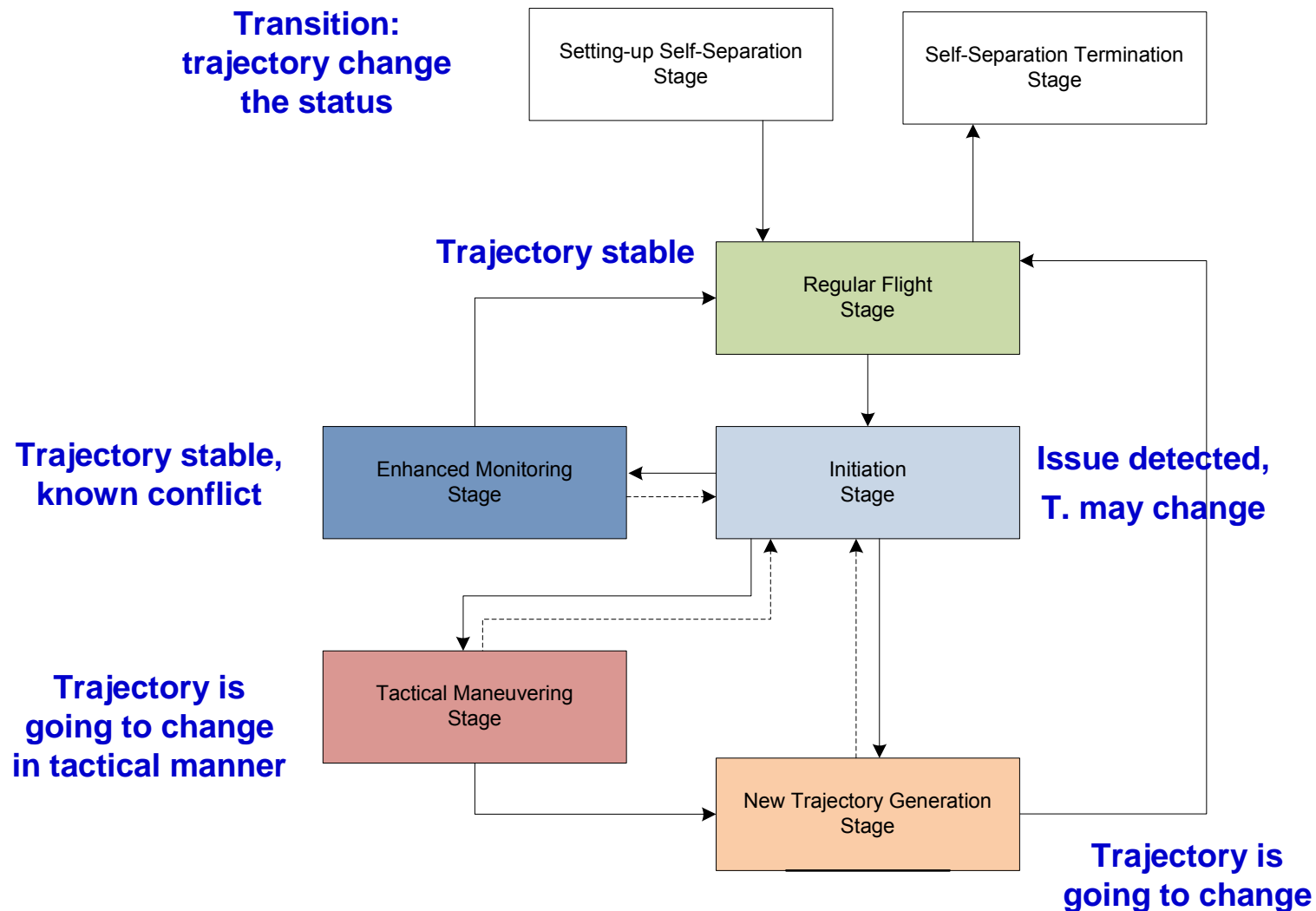
Functional Requirements

Functional Blocks = a set of related functionalities



Operational View – Decomposition to Stages

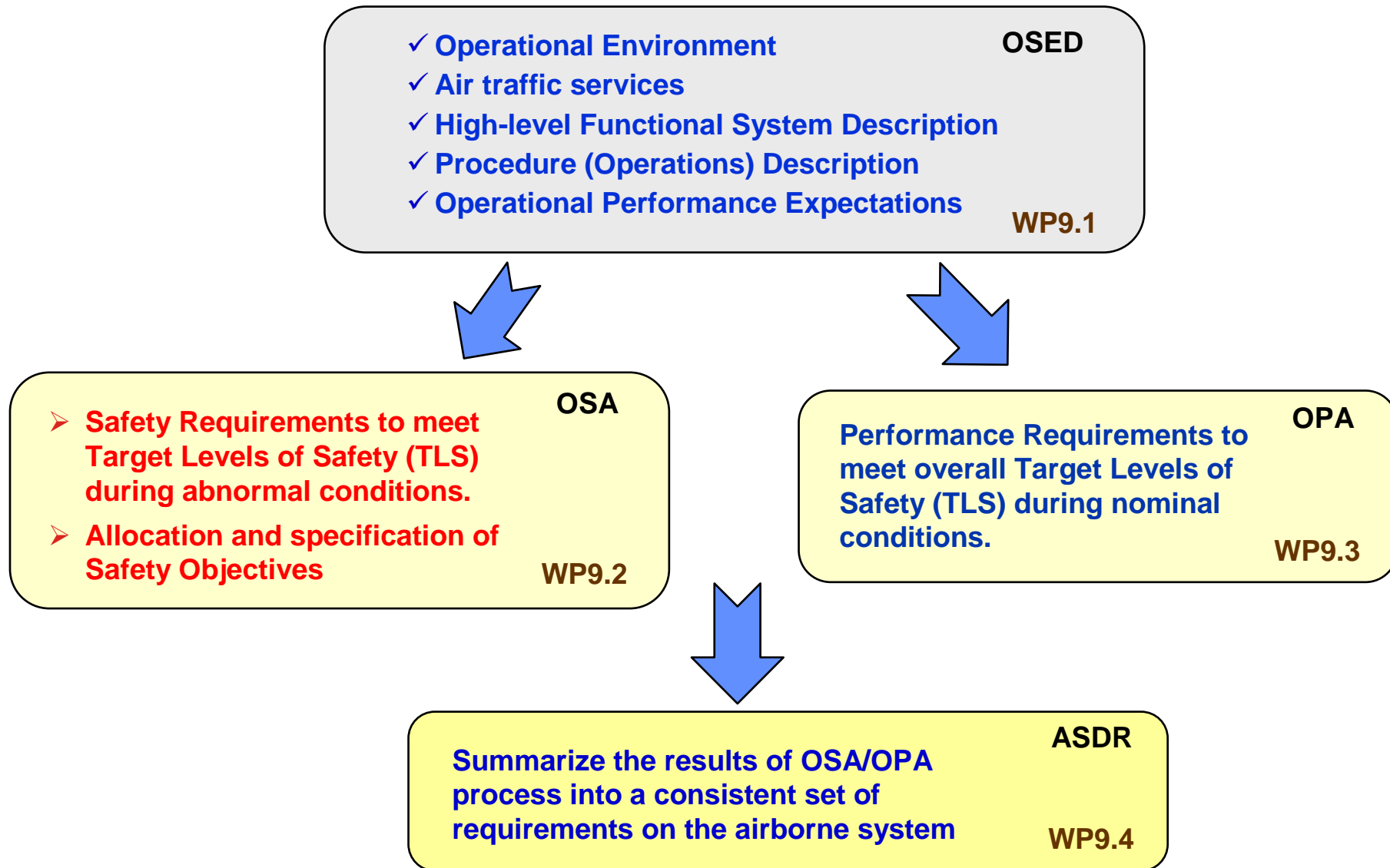
Operational perspective: Trajectory status is key.



Operational Stages vs. Functional Blocks

Stages	Functional blocks				
	Navigation	Surveillance	Events Handling	Trajectory modification	Tactical maneuver
Regular Flight Stage	X	X			
Initiation Stage	X	X	X		
Enhanced Monitoring Stage	X	X	X		
New Trajectory Generation Stage	X	X	X	X	
Tactical Maneuvering Stage	X	X	X		X

WP9: Next Steps



OSA – The Conventional ED-78 Approach

➤ Operational Hazard Analysis

- Brainstorming sessions (WP7)
- Expert judgment

➤ Event Tree Analysis

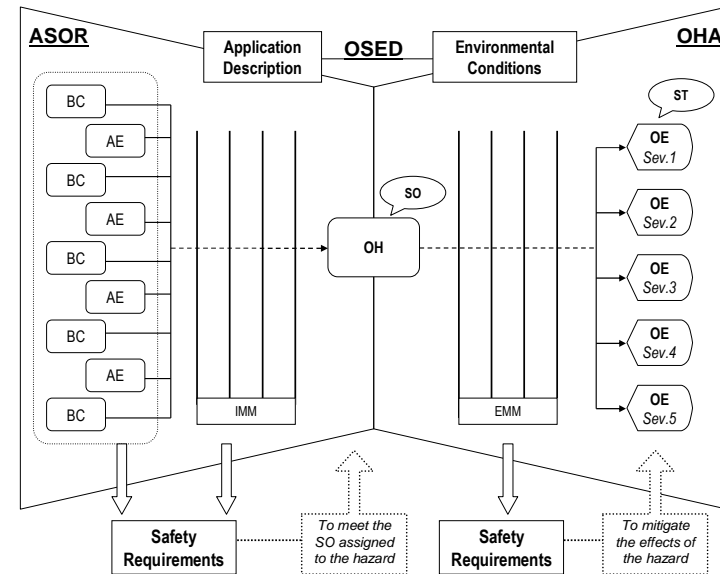
- External Mitigation Means
- Equivalent Probability determination

➤ Impact classification

- Classification of severity
- TLS specified

➤ Fault Tree Analysis

- Internal Mitigation Means
- Allocation of Safety Objectives



OPA – Main Elements

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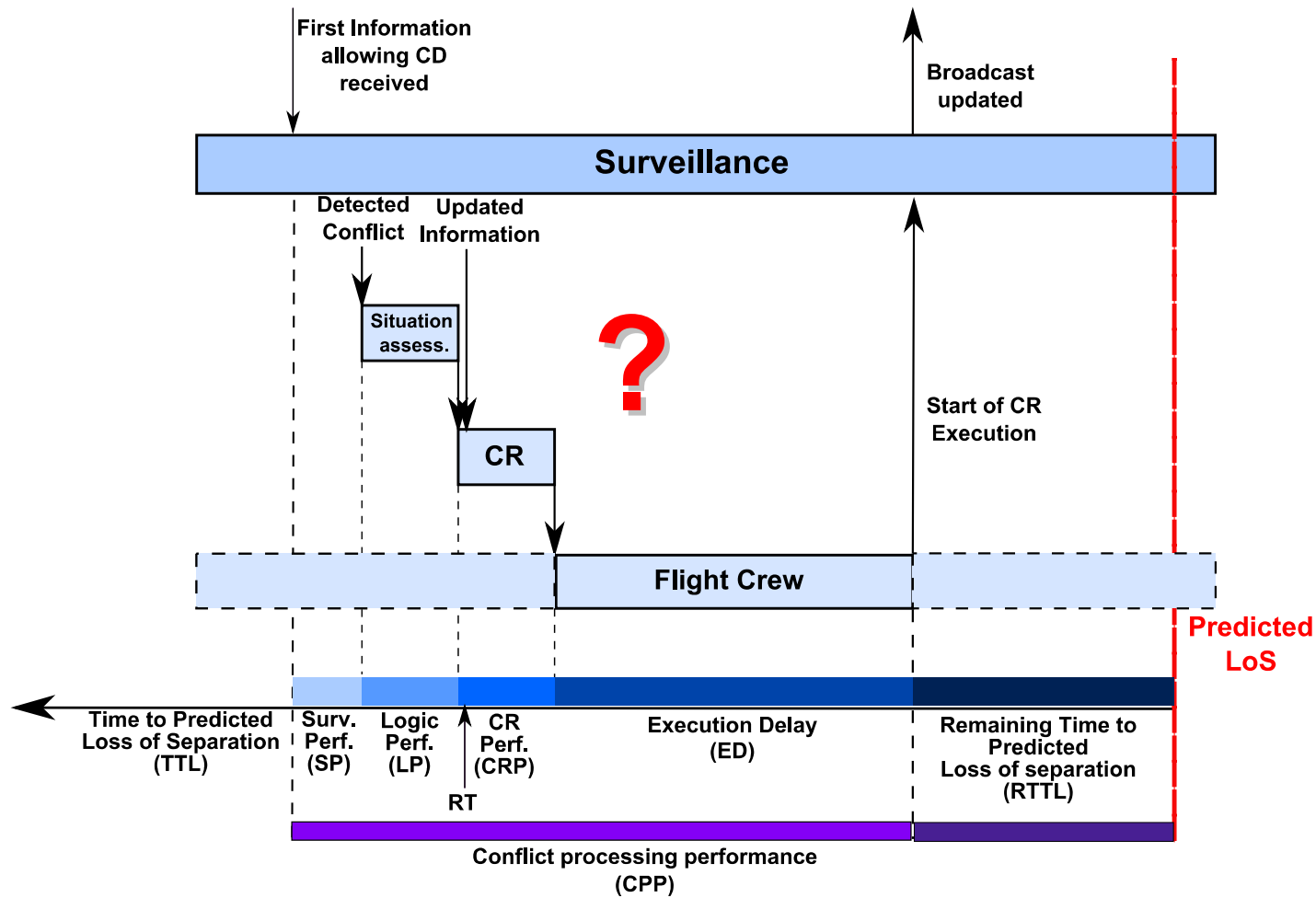
Information sharing process

Onboard conflict processing

Communications (Data link) performance

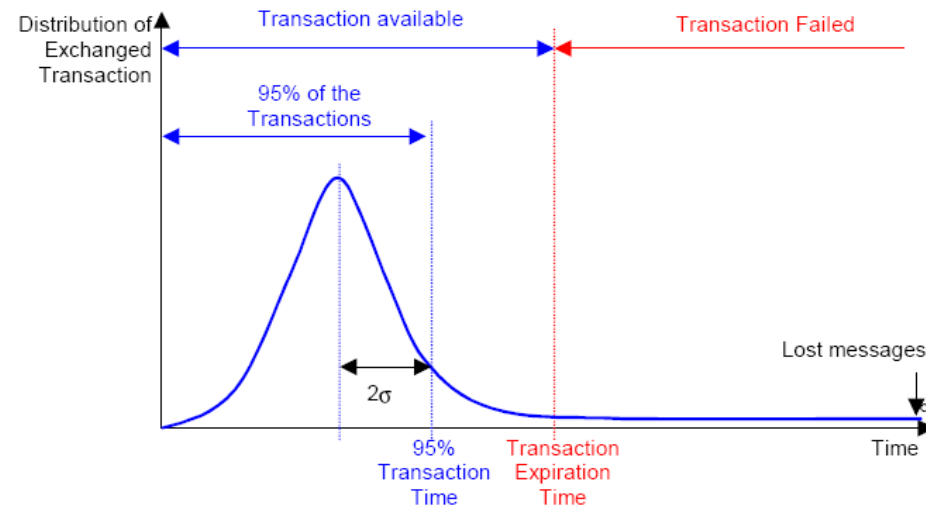
OPA – Onboard Performance Modeling

Based on the parameterization introduced by OSED (D9.1).



OPA – Communications Performance

- ICAO 9869 defines Required Communication Performance (RCP) parameters
- OPA will perform assessment of the four RCP type parameters using the DO-264/ED-78A methodology:
 - Maximum **transaction time** acceptable for the completion of the communication operation (normal operation is represented by a 95% transaction time);



- **Continuity**, i.e. probability that the communication operation can be completed within the transaction time, assuming the system was available;
- **Availability**, i.e. probability that the communication operation can be initiated when needed;
- **Integrity**, i.e. probability the communication operation is completed with an undetected error.

Thank You!



Any Questions...



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